

Indicator	Baseline from start of project or nearest available date	Y1	Y2	Y3 Oct 14-Oct 15	Y4 Oct 15-Jul 16	LOP Planned
Population of Banteng (EPL)	2074 Banteng	-	-	Stable	Stable	Stable¹
Population of critically endangered birds (PLL)	42 adults (15 nests)	-	-	Stable	Stable	Stable²

¹ Stable population is defined for Banteng as <5% decline outside the lower 95% confidence intervals.

² For the bird surveys, it is defined as population within the min-max range in number of mature animals, and no decrease in the number of nests.

Objective	Effectiveness of government and key natural resources managers at national and subnational levels to sustainably manage forests and conserve biodiversity enhanced
Required Information	Response
Indicator	0.2.1. Population numbers of Endangered Flagship species: Banteng (<i>Bos javanicus</i>) in the Eastern Plains and Endangered Birds in Prey Lang.
Definition	<p>This indicator will measure the population numbers of selected flagship species, iconic endangered species which are expected to respond to the project’s efforts to reduce deforestation and improve biodiversity conservation.</p> <p>A flagship species is a species of plant or animal which is either of elevated conservation concern itself (typically one at risk of extinction nationally or globally) or forms a good indicator species for the status of others that are of elevated concern. The flagship species in this case are selected based on their Endangered status, their presence in, and extensive coverage of, the landscapes, their iconic ‘flagship’ status, and the availability of existing baseline data on their populations.</p> <p>A stable population means that there is no statistically significant decline in the density of the species across the sampling area within the landscape. Specifically “Stable” is defined for Banteng as <5% decline outside the lower 95% confidence intervals. For the bird surveys, it is defined as population within the min-max range in number of mature animals, and no decrease in the number of nests detected during standardised surveys.</p> <p>Endangered wild cattle (Banteng) in EPL:</p> <ul style="list-style-type: none"> • Banteng (<i>Bos javanicus</i>) are an endangered species which are a key part of the ecosystem in the Eastern Plains, and a major conservation icon. • The total global population is estimated by the IUCN as 8000 individuals, but could be as low as 5000. • The population in the Eastern Plains is fast becoming recognised as the most significant population in the world, with a population estimate of 2074 in 2011/12, which has been estimated using robust scientific methods.

	<p>Critically Endangered birds in PLL include:</p> <ul style="list-style-type: none"> • Giant Ibis (<i>Thaumatibis gigantean</i>): <ul style="list-style-type: none"> ○ Critically Endangered. ○ Cambodia’s National Bird. ○ Number 1 on global EDGE list. • 3 vulture species(all Critically Endangered): <ul style="list-style-type: none"> ○ White-rumped Vulture (<i>Gyps bengalensis</i>). ○ Slender-billed Vulture (<i>Gyps tenuirostris</i>) ○ Red- headed Vulture (<i>Sarcogyps calvus</i>). • Recent surveys have found a baseline of 42 of these birds in the northern Prey Lang Landscape.
New or Existing Indicator?	New Custom Indicator
Primary Program Area (Program Element for IIP) Linkage	4.8 – Environment
Primary Program Element (Program Sub-Element for IIP) Linkage	4.8.1 – Natural Resources and Biodiversity
Linkage to Long- Term Outcome or Impact	<p>Conservation targets frequently incorporate positive responses by populations of rare or endangered species to conservation interventions. Monitoring these populations requires information on species distribution, density and abundance, and other relevant biological parameters. In its simplest form, monitoring the density of a population is a direct measure of the impact of biodiversity conservation work. Selecting wide-ranging species with large home ranges such as Banteng, which are considered globally important will assist with maintaining and enforcing governance over large tracts of protected areas. Understanding Banteng distribution will also aid in any future mitigation measures required for future development within the landscape, and will ensure that critical habitats, corridors, and linkages within the landscape remain and achieve improved condition. The critically endangered bird species highlighted, promote conservation on biodiversity including mosaic habitats that support these vulnerable species, coupled with the ecosystem services that they provide.</p> <p>Population data and species presence information collated under the SFB project will assist with providing key information to all relevant stakeholders (national and sub-national, governmental, community based organizations and private sectors). Improved forest and biodiversity</p>

	<p>management will be demonstrated in stable populations of these important flagship species. The successful monitoring of biodiversity indicators is an essential aspect to natural resource management, and this indicator will reflect the increase in capacity at a national and sub-national level of natural resource managers to implement research that both informs management actions and decisions, and reflects the success of project activities.</p>
Indicator Type	Outcome
Unit of Measure	Population estimate (Number); 95% confidence interval (Range), or minimum count (mature individuals) and minimum count (nests).
Data Collection Method	<p>Data will be collected on the species in question, using robust scientific monitoring techniques. Line transect-based distance sampling is one of the most widely applied method for estimating the abundance of biological populations, and is used on an annual or twice-annual basis in the EPL. Historical baselines exist for Banteng in the EPL already, and temporal comparison is appropriate as the same method has always been used for this species.</p> <p>For the suite of threatened bird species in PLL, changes in relative population density will be measured by continuing with the survey methodology that has been used to successfully monitor these species for several years. This allows the use of historical data to be used as a baseline from which changes in population as a result of the SFB Project can be measured. The vulture species are effectively measured using vulture “restaurants”, and these surveys will be continued, in coordination with the national vulture census.</p>
Use of Indicator	This indicator will be used as a measure of the impacts of biodiversity conservation activities. This indicator is a reliable measure that demonstrates the real target-level impacts of USG investments in the biodiversity conservation sectors.
Data Source and Reporting Frequency	<p>All historic data on the flagship species have been collected by either WWF or WCS in collaboration with the Forestry Administration or the Ministry of Environment, and WWF and WCS retain user rights to these data. All new data will be collected by WWF and WCS in collaboration with government partners.</p> <p>The data for birds will be reported in Year 3 and Year 4.</p> <p>Incidental data on Banteng will be reported in Year 3,</p>

	Year 4, and LOP end.
Known Data Limitations	<p>Data on Banteng from Seima Protection Forest are marginally less precise than from the other two protected areas due to lower underlying density (a result of larger areas of evergreen and semi-evergreen forest). Estimates are improved by “pooling” data from across the landscape – a recommended and accepted method under such circumstances.</p> <p>For Birds the two methods employed result in “minimum count” estimates, which can only be used to measure relative changes in population abundance as the probability of detection is not incorporated into the methodology, thus precluding absolute population estimates with an estimate of uncertainty. These methods are however, appropriate for the species within this landscape, and have been widely published in the peer-reviewed literature.</p>
Baseline Timeframe	The baseline will developed from combined data held by project partners from intensive biodiversity monitoring work done prior to the start of the project.
Responsibility	Brad Arsenault, AOR/Environment Officer, USAID/Cambodia Phone: +855-023-728-300 x8328; Email: barsenault@usaid.gov
Disaggregate(s)	Landscape/Region [Prey Lang, Eastern Plains]; Species;